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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003904928 for a patent by FRED MINITER as filed on 09 September 2003.

WITNESS my hand this
Twenty-third day of August 2004

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AUSTRALIA
Patents Act 1990

PROVISIONAL SPECIFICATION FOR THE INVENTION ENTITLED:

A THERMALLY INSULATING WALL CONSTRUCTION

The invention is described in the following statement:-

The present invention relates to a wall construction and, in particular, to a thermally insulating wall structure which finds particular application in buildings constructed in areas having extremes of either hot or cold, or both.

Many forms of thermally insulating wall construction have been proposed, however, in order to be practical not only must the level of thermal insulation be good, but the wall must be structurally strong and easy to construct. Unless a particular wall construction meets all three of these desiderata, it is unlikely to be commercially successful.

The object of the present invention is to provide an improved wall construction which makes use of both the concept of a cavity wall, and also the thermally insulating properties of reflective sheets, for example those fabricated from metal foils or metal coated films.

In accordance with a first aspect of the present invention there is disclosed a thermally insulating wall construction comprising a pair of masonry panels each having an internal surface and an observable surface and being arranged with said internal surfaces facing each other to define an air cavity between said panels, said internal surfaces each having a plurality of recesses interspersed between protrusions with said recesses and protrusions of one said internal surface being arranged opposite the recesses and protrusions of the other internal surface, and at least one reflective sheet which extends between adjacent protrusions, and which is spaced from the interior of said recesses.

In accordance with a second aspect of the present invention there is disclosed a method of fabricating a thermally insulating wall.

Two embodiments of the present invention will now be described with reference to the drawings in which:

Fig. 1 is a schematic perspective cut away view of a wall constructed in accordance with the first embodiment of the present invention,

Fig. 2 is a perspective view of the interior surface of either one of the panels from which the wall of Fig. 1 is constructed,

Fig. 3 is a substantially horizontal and transverse cross sectional view taken through the wall construction of Fig. 1, and

Fig. 4 is a view similar to Fig. 3 but of a second embodiment.

As seen in Fig. 1, the wall 1 of the first embodiment sits on a foundation 2 which in the first embodiment is a concrete slab 3. However, the foundation 2 could equally be a timber or metal foundation formed from beams or the like. The wall 1 is fabricated from two like panels 5 and which in Fig. 1 are indicated as an exterior panel 5A and an interior panel 5B. The base of the exterior panel 5A sits on a Z-shaped galvanised locating strip 7 whilst the base of the interior panel 5B abuts a lip 8 in the slab 3.

At their upper edges, the panels 5A and 5B are retained within an E-shaped galvanised cap plate 9. The cap plate 9 has a centrally located and longitudinally extending groove 10 the dimensions of which define the corresponding dimensions of an interior cavity 12 formed between the two panels 5A and 5B. Located in the slab 3 below the cavity 12 is a slot 13 within which, at spaced apart intervals along the length of the wall 1, a number of threaded rods 15 (only one of which is illustrated) are positioned. The rods 15 are maintained in a vertical orientation by means of a chemical anchor (such as a two part epoxy resin) which surrounds the lower end of each rod 15 and binds it with the slot 13. The upper end of each of the threaded rods 15 passes through the groove 10 and carries a nut 16 which enables the rod 15 to be placed in tension to thereby urge the cap plate 9 against the panels 5 which are thereby placed in compression. A length of sealing tape 18, which is illustrated in truncated fashion in Fig. 1, is used to seal each side edge of the cavity 12. In this way the air within the cavity 12 remains stagnant and does not move or circulate.

As seen in Fig. 2, each of the panels 5 has an internal surface 21 and an observable surface 22 which may form either the exterior of the wall 1 or the interior of the wall 1. The internal surface 21 is provided with a series of vertically orientated, longitudinally extending and substantially parallel grooves 24 and ridges 25. The grooves 24 are substantially semi-circular in configuration whilst the ridges 25 have flat topped crests 26.

Illustrated in cutaway fashion in Fig. 2 is a scalloped sheet of double sided aluminium foil or double sided aluminium coated film 28 which extends over the entire internal surface 21 and is truncated in Fig. 2 to reveal the structure of the grooves 24. The film 28 is provided with flats 29 and curves 30. The radius of curvature of curves 30 is less than the corresponding radius of curvature of the grooves 24.

As best seen in Fig. 3, when the two panels 5A, 5B are arranged with their internal surfaces 21 facing each other, the gap between the crests 26 is preferably filled by a packing strip 31 of polystyrene, or similar material, which extends along the length of each crest 26 or at least partially therealong. The packing strips 31 maybe provided as a single piece as illustrated in Fig. 3 or as two pieces which abut each other so that both panels 5A and 5B are entirely identical. The packing strip 31 preferably provides a measure of resilience, or an ability to absorb shocks arising from horizontal forces applied to the observable surfaces 22.

To those skilled in the thermally insulating arts, it will be apparent from Fig. 3 that a number of sequential thermal barriers are erected. The first thermal barrier is the observable surface 22 and the thickness of the panel 5A between the observable surface 22 and the base of the groove 24. The next barrier is the air barrier between the base of the groove 24 and the exterior surface of the film 28. The next barrier is formed by the interior of the film 28 whilst the next barrier is formed by the air gap between the two films 28. The next barrier is the interior of the second film 28. Similarly, the following barrier is the exterior surface of that film 28. The next barrier is again the air gap between the second film 28 and the base of the groove 24 in the panel 5B. The final barrier is the thickness between the observable surface 22 of the panel 5B and the base of the grooves 24. The sequential barriers result in the accumulation of desirable thermally insulating properties and results in a very high R rating.

Turning now to Fig. 4, a second embodiment of a wall 100 is illustrated therein. The wall 100 is similar to that of the first embodiment except that the grooves 124 and ridges 125 have a different profile and only a single film 128 coated

on each side with aluminium in order to form a reflective thermal barrier. The polystyrene packing strips 131 are essentially as before.

The foregoing describes only two embodiments of the present invention and modifications, obvious to those skilled in the art, can be made thereto without departing from the scope of the present invention. For example, the aluminium foil or film 28 can be perforated in the region of each crest 26 to allow an adhesive bonding cement to bond between the panels 5, through the foil or film 28 and on to the packing strip 31. The foil or film 28 preferably has some "memory" and can therefore be bent during handling but then return to the intended scalloped shape. Similarly, the grooves 28, 128 can be of any shape or profile. In addition, in multi-storey buildings, the rods 15 can be dispensed with as the upper floors maintain the panels 5 in compression.

The term "comprising" (and its grammatical variations) as used herein is used in the inclusive sense of "having" or "including" and not in the exclusive sense of "consisting only of".

ASPECTS OF THE INVENTION

The following paragraphs define some aspects of the present invention:

1. A thermally insulating wall construction comprising a pair of masonry panels each having an internal surface and an observable surface and being arranged with said internal surfaces facing each other to define an air cavity between said panels, said internal surfaces each having a plurality of recesses interspersed between protrusions with said recesses and protrusions of one said internal surface being arranged opposite the recesses and protrusions of the other internal surface, and at least one reflective sheet which extends between adjacent protrusions, and which is spaced from the interior of said recesses.

2. The construction as defined in paragraph 1 having a single substantially centrally located said sheet intermediate said pair of panels.

3. The construction as defined in paragraph 1 having a pair of said sheets each of which extends between said adjacent protrusions, each of which at least partially enters the recesses of the corresponding panel and each of which is spaced from the interior of said corresponding recesses.

4. The construction as defined in paragraph 3 wherein said recesses and protrusions respectively comprise a series of substantially parallel grooves and ridges.

5. The construction as defined in paragraph 4 wherein said grooves are substantially semi-circular in transverse cross section and said ridges have substantially flat and co-planar crests.

6. The construction as defined in paragraph 5 wherein strips of resilient cellular insulation material are positioned extending at least partially along said crests.

7. The construction as defined in paragraph 6 wherein said strips are interposed between corresponding protrusions of said internal surfaces.

8. The construction as defined in paragraph 7 wherein said strips are dimensioned to comprise a shock absorbing packing between said pair of masonry panels which, but for said strips, would otherwise have said corresponding protrusions substantially abutting.

9. The construction as defined in any one of paragraphs 1-8 wherein said reflective sheet comprises double sided aluminium film coated plastics.

10. A thermally insulating wall construction substantially as herein described with reference to Figs. 1-3 or Fig. 4 of the drawings.

11. A masonry panel substantially as herein described with reference to Figs. 1-3 or Fig. 4 of the drawings.

12. A method of fabricating a thermally insulating wall construction, said method being substantially as herein described with reference to the drawings.

Dated this 9th day of September 2003

FRED MINITER

By:

FRASER OLD & SOHN

Patent Attorneys for the Applicant

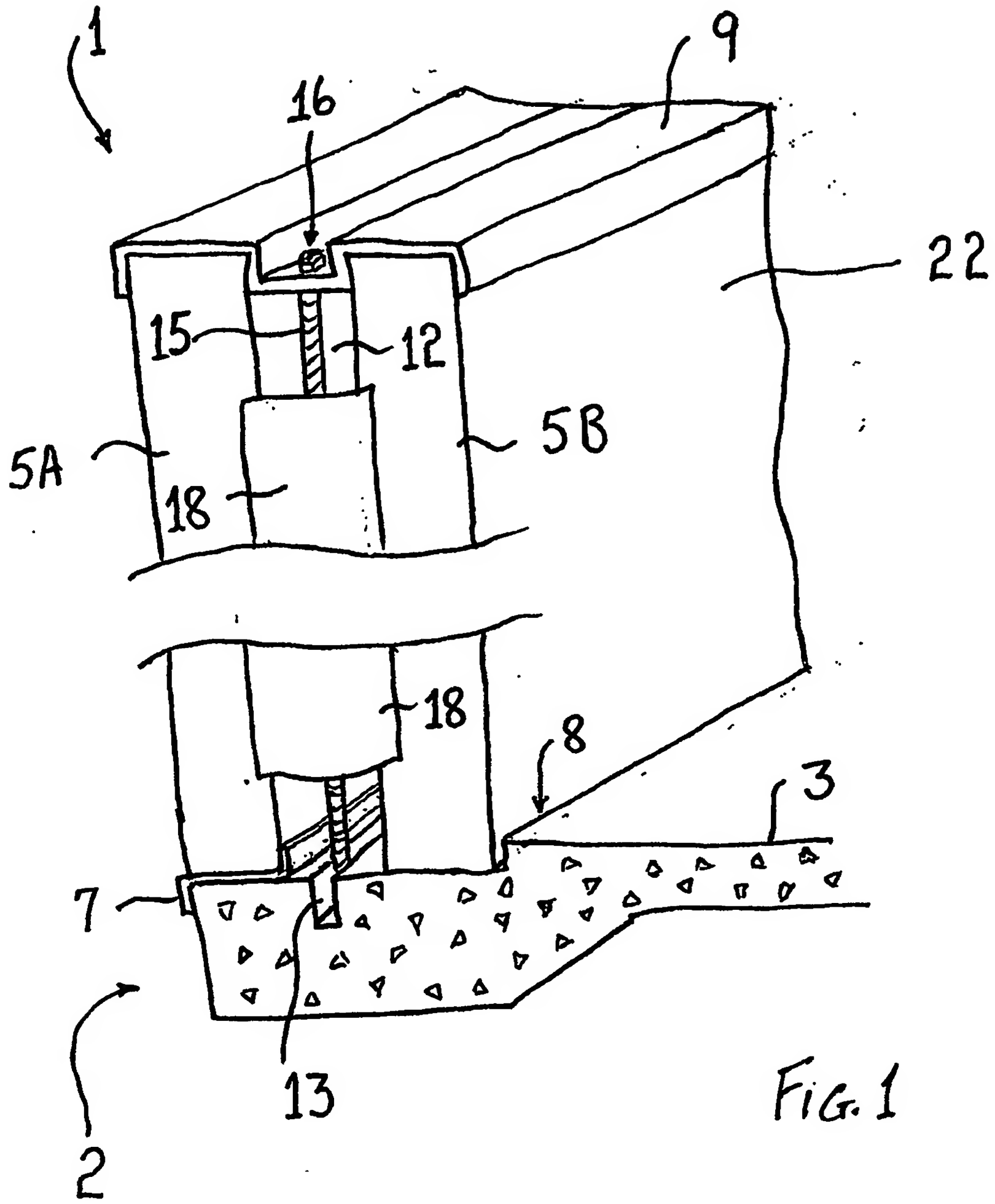

FIG. 1

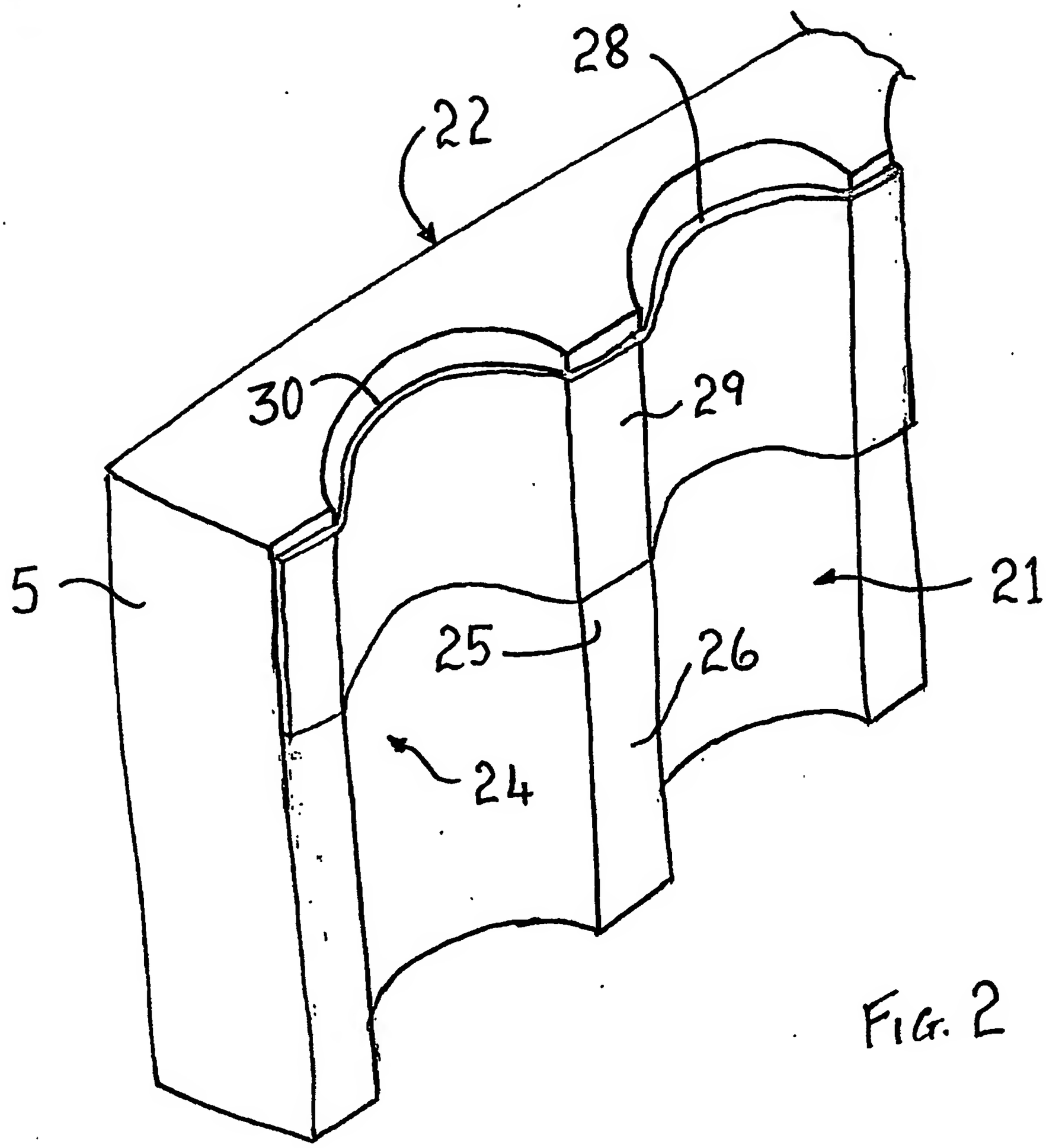

FIG. 2

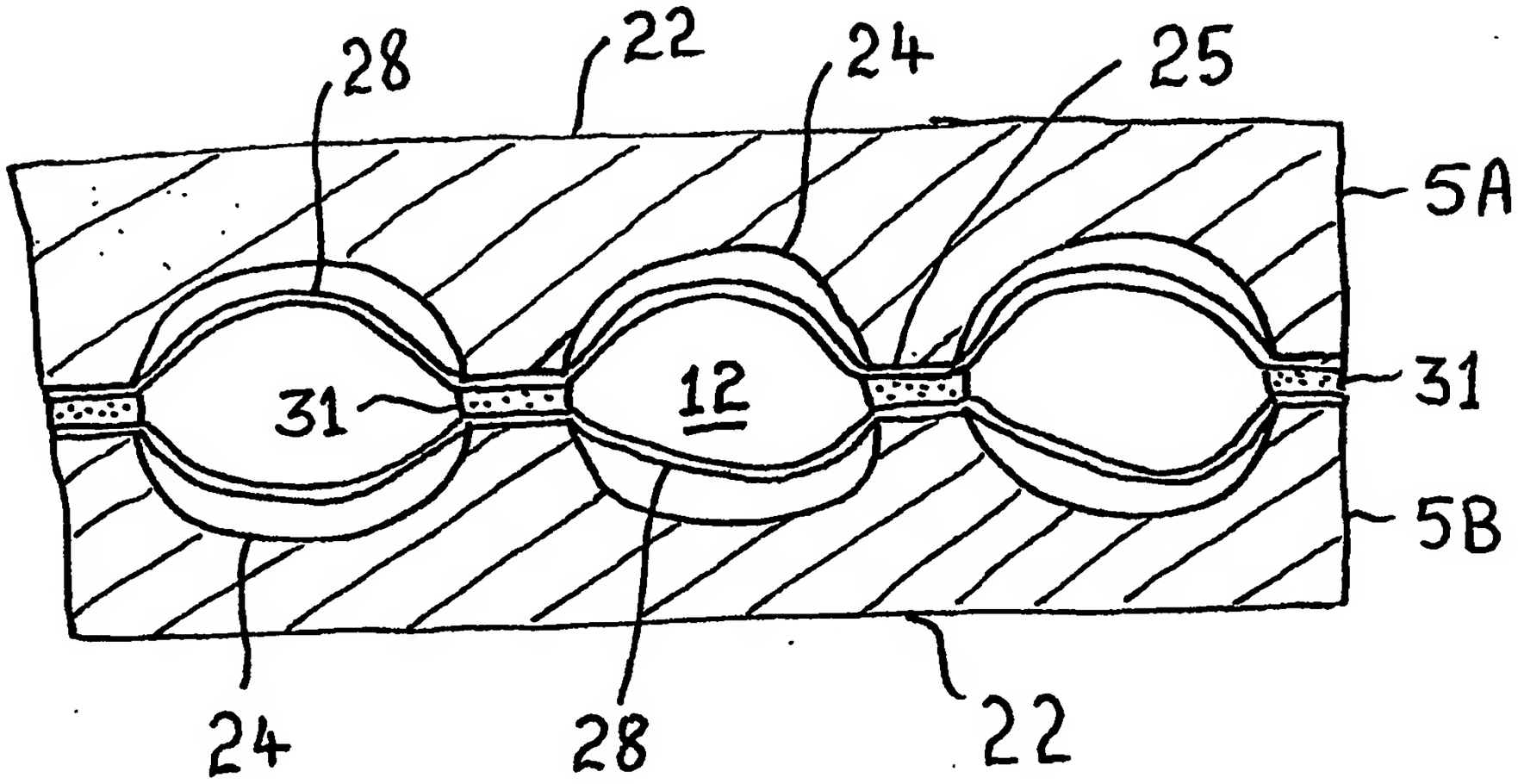

FIG. 3

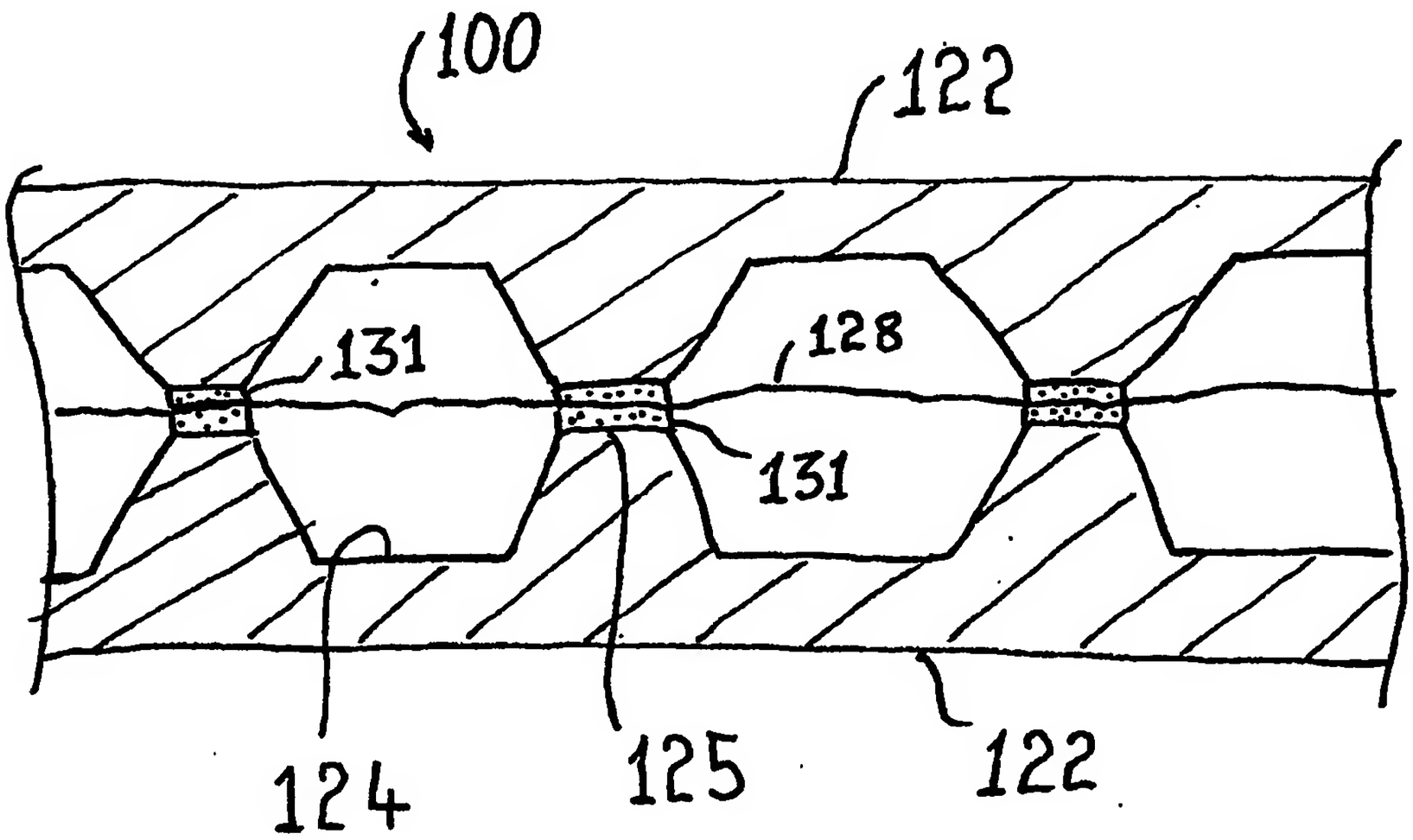

FIG. 4